IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	G. Chrysanthakopoulos et al.	Attorney Docket No.: MSFT121368
Application No.: 10/718,199		Group Art Unit: 2153
Filed:	November 20, 2003	
Title:	DECENTRALIZED OPERATING SYSTEM	

PETITION TO MAKE SPECIAL UNDER C.F.R. § 1.102(D) AND § 708.02 OF THE M.P.E.P.

March 29, 2004

TO THE COMMISSIONER FOR PATENTS:

On November 20, 2003, applicants filed the above-identified patent application, which has been accorded Application Serial No. 10/718,199. Applicants would like to request special examining procedure so that the above-identified patent application be granted special status for accelerated examination.

I. DISCUSSION OF THE APPLICABLE LAW

C.F.R. §§ 1.102(a) and (d) allow an application to be advanced out of turn for examination. A new application (one which has not received any examination by the Examiner) may be granted special status provided that applicants (and this term includes applicants' attorney or agent) comply with the requirements of § 708.02 of the M.P.E.P.

II. COMPLIANCE WITH THE PETITION TO MAKE SPECIAL REQUIREMENTS

Upon information and belief, the above-identified application can be made special and considered for accelerated examination because:

    (A)   Submitted herein is a Petition to Make Special accompanied by the fee set forth in 37 C.F.R. § 1.17(h);

    (B)   All claims are directed to a single invention;

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(C)   A pre-examination search was made in which the field of search includes Class 709, subclasses 104, 201, 226, and 243. Dr. El-Hady of Art Unit 2154 was consulted in regard to the field of search. Additionally, the pre-examination search was conducted on the EAST system of the United States Patent and Trademark Office (the "Office"); and

(D)   Applicants submit one copy each of the references that are deemed most closely related to the subject matter encompassed by the claims.

(E)   Prior to providing a detailed discussion of the references, which discussion points out how the claimed subject matter is patentable over the references, applicants set forth a brief background of the invention. The brief background and the discussion of the disclosed embodiments of applicants' invention as well as the discussion of the references are not provided to define the scope or interpretation of any of the claims of this application. Instead, its purpose is to help the Office better appreciate applicants' invention discussed thereafter.

A. Background of the Invention

The history of computer science, like the history of political science, progresses toward decentralization. In the history of the rise of nation-states, for example, authority first resided in monarchies, government by a single individual who ruled in his own interests over the many. The struggle between the powerful upper strata of societies and the monarch eventually produced aristocracy, government by a select few who ruled in their own interests over the many. With the experience of centuries, the people of the world collectively came to realize that good governments are those that serve the general welfare instead of the narrow interests of individuals or of the few. It is this realization that gave rise to democracy, government by the many of the many.

Computer systems have progressed similarly: Mainframe computers, introduced in the early 1950s, were highly centralized, large enough to fill an entire room and with glass walls through which visitors could gawk at flashing vacuum tubes. Users brought their work to the mainframe computers to be processed in a manner not dissimilar to commoners seeking an

audience with the king. Minicomputers, arriving in the early 1960s, were built from transistors instead of vacuum tubes, and allowed organizations using them to enjoy a higher level of input and output from users connected to the minicomputers via dumb terminals, marking the start of decentralization. Appearing in the mid-1970s were microcomputers, in which large-scale integration enabled thousands of circuits to be incorporated on a single chip, called a microprocessor. Less powerful than minicomputers and mainframes when they first appeared, microcomputers—essentially, in today's terms, desktop PCs—have nevertheless continued to evolve and have placed in the hands of ordinary people machines that are more powerful than the mainframe computers of yesteryear, and at a fraction of the cost. The more recent merging of PCs and the Internet illuminates the possibilities for the further decentralization of computers by allowing not only people but also machines and other resources to cooperate from afar and locally to form functionalities richer than previously possible.

Centralized operating systems, such as Linux, do not work well for large-scale computer systems, such as the Internet, that are decentralized. There are too many dependencies due to monolithic designs that date back to the days of mainframe computers. All resources are assumed to be local yet resources are increasingly available at the periphery rather than at the core. Without an operating system that can recognize decentralized resources and can coordinate these decentralized resources, near or far, to create functionalities desired by users, users may eventually no longer trust the computer system to provide a desired computing experience, and demand for the computer system will diminish over time in the marketplace. Thus, what is needed is a non-centralized mechanism to orchestrate computations both at the periphery and at the core without appealing to any centralized authority.

B. Explanation of the Invention Defined in the Claims

Regarding the claims, independent Claim 1 is directed to a computer system. The computer system is recited as comprising services for representing resources. Each service

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includes a designation primitive, a behavioral primitive that comprises a unilateral contract, and a communication primitive. The computer system is further recited to comprise a decentralized operating system for orchestrating the services executing on the computer system so as to control and coordinate resources.

Claims 2-8 are dependent from independent Claim 1 and are directed to further limitations of the computer system described above. Claim 2 is dependent on Claim 1 and recites that the computer system includes a microcomputer, a personal digital assistant, a cellular phone, or a display. Claim 3 is dependent on Claim 1 and recites that the designation primitive includes a port identifiable by an identifier that includes a uniform resource identifier. Claim 4 is dependent on Claim 3 and recites that the port is endued with a behavior type as specified by a unilateral contract. Claim 5 is dependent on Claim 1 and recites that a unilateral contract of the behavioral primitive defines a protocol for exchanging messages in a particular order with a service to whom the unilateral contract belongs. Claim 6 is dependent on Claim 5 and recites that the communication primitive includes a set of message types usable in the messages exchanged among services so as to call a service to perform a certain task. Claim 7 is dependent on Claim 6 and recites that the decentralized operating system separates the control information from the data information in the messages when the messages are exchanged. Claim 8 is dependent on Claim 1 and recites that services include services.

Independent Claim 9 is directed to a network system for networking computer systems. The networked system is recited as comprising a first decentralized operating system executing on a computer system, which includes a first distributing kernel for designating uniform resource identifiers for a first set of services and distributing messages among the first set of services. The unilateral contract expresses behaviors of the service.

Claims 10-18 are dependent from independent Claim 9 and are directed to further limitations of the networked system described above. Claim 10 is dependent on Claim 9 and

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recites that the services include device drivers for devices. Claim 11 is dependent on Claim 9 and recites a process kernel for communicating messages as processes among services. Claim 12 is dependent on Claim 10 and recites an operating system kernel for managing memory, controlling devices, maintaining time and date, and allocating system resources. Claim 13 is dependent on Claim 9 and recites a network coupled to the first computer system. The network is selected from a group consisting of high bandwidth, low latency systems; high bandwidth, high latency systems; low bandwidth, high latency systems; and low bandwidth, low latency systems. Claim 14 is dependent on Claim 13 and recites a second decentralized operating system executing on another computer system coupled to the network, which includes: a second distributing kernel for designating uniform resource identifiers for a second set of services and distributing messages among the second set of services. Each service includes a unilateral contract. The unilateral contract expresses behaviors of the service. Claim 15 is dependent on Claim 14 and recites that a resource is represented as a service from the second set of services which is orchestrated by the first distributing operating system. Claim 16 is dependent on Claim 14 and recites that a service from a second set of services registers with the first distributing kernel to obtain a uniform resource identifier. Claim 17 is dependent on Claim 14 and recites that the first distributing kernel distributes a message to a service from a first set of services. The message is sent by a service from a second set of services. Claim 18 is dependent on Claim 14 and recites that the first decentralized operating system orchestrates a composition of a service from a first set of services and a service from a second set of services.

Independent Claim 19 recites a computer system. The computer system is recited as comprising a decentralized operating system that includes a distributing kernel. The distributing kernel comprises a URI manager for managing names. Each name constitutes a unique designation of a service at the computer system so that the service can be discovered. The distributing kernel is further recited as comprising a message dispatcher for forwarding messages

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among services. Each service is identifiable by a name managed by the URI manager. Each service being associated with a unilateral contract.

Claims 20-26 are dependent from independent Claim 19 and are directed to further limitations of the computer system described above. Claim 20 is dependent on Claim 19 and recites that the distributing kernel further comprises a security manager for controlling authentication and authorization of rights and restrictions among services. Claim 21 is dependent on Claim 19 and recites that the distributing kernel further comprises a service loader for executing a sequence of instructions for loading components and services. The service loader is capable of dynamically loading and unloading services during the operation of the decentralized operating system. Claim 22 is dependent on Claim 19 and recites that the URI manager receives a register message from a service to obtain a unique designation and assigns the unique designation to the service. The URI manager is capable of receiving an unregistered message for removing an assigned unique designation from a registry. Claim 23 is dependent on Claim 19 and recites that the message dispatcher forwards a message from a first service to a second service if the first service has a first uniform resource identifier assigned by the URI manager and if the second service has a second uniform resource identifier assigned by the URI manager. Claim 24 is dependent on Claim 19 and recites that the message dispatcher includes a message validity verifier for verifying that a message sent to the message dispatcher is a message whose structure complies with the SOAP protocol. Claim 25 is dependent on Claim 19 and recites a network manager for distributing messages forwarded by the message dispatcher to another computer system. Claim 26 is dependent on Claim 25 and recites that the network manager comprises a serializer/deserializer, a transmission protocol processor, and a control/data plane separator.

Independent Claim 27 recites a method implemented on a computer system. The method of Claim 27 recites an act of assigning a first unique name to a first service upon request. The

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first service includes a first unilateral contract for expressing the behaviors of the first service. The method is further recited to include an act of distributing a message to the first service using the unique name. The message is sent by a second service having a second unique name. The second service includes a second unilateral contract for expressing the behaviors of the second service.

Claims 28-34 are dependent from independent Claim 27 and are directed to further limitations of the method described above. Claim 28 is dependent on Claim 27 and recites an act of loading a network manager and other services according to instructions written in a customizable, tag-based language. Claim 29 is dependent on Claim 28 and recites an act of spawning a service to listen for incoming messages for the first service that has been assigned the first unique name. Claim 30 is dependent on Claim 29 and recites an act of rejecting the message without distributing the message if a structure of the message fails to comply with a protocol for exchanging structured and type information of messages written in a customizable, tag-based language. Claim 31 is dependent on Claim 30 and recites forwarding the message to the first service without routing the message through the network manager if the first service and the second service runs on a computer system. Claim 32 is dependent on Claim 30 and recites an act of forwarding the message to the first service by routing the message through the network manager if the first service runs on a first computer system whereas the second service runs on a second computer system. Claim 33 is dependent on Claim 32 and recites that the act of forwarding includes transmitting data information separately from transmitting control information. Claim 34 is dependent on Claim 33 and recites that the act of transmitting includes transmitting data information in accordance with transmitted control information.

Independent Claim 35 is a computer-readable medium having instructions thereon for implementing a method. The method is recited as comprising an act of assigning a first unique name to a first service upon request. The first service includes a first unilateral contract for

expressing the behaviors of the first service. The method further recites an act of distributing a message to the first service using the unique name. The message is sent by a second service having a second unique name. The second service includes a second unilateral contract for expressing the behaviors of the second service.

Claims 36-40 are dependent from independent Claim 35 and are directed to further limitations of the method described above. Claim 36 is dependent on Claim 35 and recites an act of loading a network manager and other services according to instructions written in a customizable, tag-based language. Claim 37 is dependent on Claim 36 and recites an act of spawning a service to listen for incoming messages for the first service that has been assigned the first unique name. Claim 38 is dependent on Claim 37 and recites an act of rejecting the message without distributing the message if a structure of the message fails to comply with a protocol for exchanging structured and type information of messages written in a customizable, tag-based language. Claim 39 is dependent on Claim 38 and recites an act of forwarding the message to the first service without routing the message through the network manager if the first service and the second service runs on a computer system. Claim 40 is dependent on Claim 38 and recites an act of forwarding the message to the first service by routing the message through the network manager if the first service runs on a first computer system whereas the second service runs on a second computer system.

C. Summary of the References

1. Summary of U.S. Patent No. 6,691,148, Issued to Zinky et al. (hereinafter "Zinky")

Zinky describes a framework for providing quality of service requirements in a distributed object-oriented computer system. The system of Zinky assures quality of service provided by a distributed network having at least one object. The system of Zinky creates a contract that stores levels of quality of service offered by the network, determines the quality of service required by the object, and evaluates the contract to select a level of quality of service

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that corresponds to a current quality of service provided by the network. The system then compares the current quality of service to the required quality of service, and adjusts the current quality of service to obtain the required quality of service when the current quality of service fails to satisfy the required quality of service.

Among other limitations, applicants are unable to find where Zinky teaches or suggests "a decentralized operating system for orchestrating the services executing on the computer system so as to control and coordinate resources" as recited in Claim 1. Zinky uses a central resource utilization controller 346, which is a conventional computer, such as an IBM-compatible computer, to allocate scarce resources on a system-wide basis to monitor and control the use of a particular shared resource or set of resources. No "decentralized operating system for orchestrating the services executing on the computer system so as to control and coordinate resources" as recited in Claim 1 is taught or suggested by Zinky. Moreover, applicants are unable to find where Zinky teaches or suggests "a first distributing kernel for designating uniform resource identifiers for a set of services and distributing messages among the first set of services, each service including a unilateral contract, the unilateral contract expression behaviors of the service," among other limitations, as recited in Claim 9. Applicants also are unable to find where Zinky teaches or suggests "a URI manager for managing names, each name constituting a unique designation of a service at the computer system so that the service can be discovered," among other limitations, as recited in Claim 19. In addition, applicants are unable to find where Zinky teaches or suggests "assigning a first unique name to a first service upon request, the first service including a first unilateral contract for expressing the behaviors of the first service," among other limitations, as recited in Claim 27.

2. Summary of U.S. Patent No. 5,165,018, Issued to Simor (hereinafter "Simor")

Simor is directed to self-configuration of nodes in a distributed message-based operating system. The distributed system of Simor comprises a plurality of nodes. Each node is provided

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with the same set of generic configuration rules which configures the resources for the node according to the application requirements and the hardware configuration of the node. The resource server modules are configurable at run-time by node-based configuration management processes in accordance with information contained in resource definition messages. A resource definition message is derived from a resource template message in accordance with the information contained in the node definition message. According to Simor, adding or modifying resources at a given node can be accomplished at start-up or run-time without affecting the remainder of the system. Simor describes that his computer operating system operates upon processes, messages, and contexts. See Col. 7, lines 30-33. Processes of Simor are referenced without regard to their physical location via a small set of message-passing primitives. See Col. 7, lines 35-37. Simor also discusses that every process of his system also has a name which is a variable-length string of characters assigned by the programmer. Messages in the system of Simor provide a mechanism by which hardware transparency is achieved. See Col. 8, lines 65-66. A process of Simor located anywhere in the virtual machine can send a message to any other process if it knows its name. See Col. 8, lines 67-68. The virtual machine of Simor makes devices look like processes. See Col. 9, lines 9-10.

Unlike the claimed invention, applicants are unable to find where Simor teaches or suggests "services for representing resources, each service including a designation primitive, a behavioral primitive that comprises a unilateral contract, and a communication primitive," among other limitations, as recited in Claim 1. Moreover, applicants are unable to find where Simor teaches or suggests "a distributing kernel for designating uniform resource identifiers for a first set of services and distributing messages among the first set of services, each service including a unilateral contract, the unilateral contract expressing behaviors of the service," among other limitations, as recited in Claim 9. Applicants are also unable to find where Simor teaches or suggests "a URI manager for managing names, each name constituting a unique

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designation of a service at a computer system so that the service can be discovered," among other limitations, as recited in Claim 19. Simor teaches that "[e]very process also has 'name' which is a variable-length string of characters assigned by the programmer. A name need not be unique, and this ambiguity may be used to add new services transparently." See Col. 8, lines 9-13 of Simor. Simor teaches away from the claimed invention. For example, Claim 27 recites "assigning a first unique name to a first service upon request, the first service including a first unilateral contract for expressing the behaviors of the first service." This is not taught or suggested by Simor.

3. Summary of Patent Application Publication No. 2003/0212761 by Meredith et al. (hereinafter "Meredith I")

The system of Meredith I teaches a computer-readable means for storing a program. The program includes expressions written in a process-based language representing protocol-based applications as processes. The system of Meredith I also includes a process kernel for executing the expressions in the program. The expressions specify the interactions of processes by allowing a named organizational scheme of data written in a customizable, tag-based language to be exchanged as a process among processes. The named organizational scheme of data is bound to the scopes of processes that send and receive the named organizational scheme of data. Meredith I also teaches a method that comprises an act of representing protocol-based applications as processes when process expressions in a program written in a process-based language are executed.

Applicants are unable to find where Meredith I teaches or suggests the subject matter of the claimed invention. For example, applicants are unable to find the limitation "services for representing resources, each service including a designation primitive, a behavioral primitive that comprises a unilateral contract, and a communication primitive," among other limitations, as recited in Claim 1. Moreover, applicants are unable to find the limitation "a first distributing

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kernel for designating uniform resource identifiers for a first set of services and distributing messages among the first set of services, each service including a unilateral contract, the unilateral contract expressing behaviors of the service," among other limitations, as recited in Claim 9. Applicants are also unable to find the limitation "a URI manager for managing names, each name constituting a unique designation of a service at the computer system so that the service can be discovered," among other limitations, as recited in Claim 19. In addition, applicants are unable to find the limitation "assigning a first unique name to a first service upon request, the first service including a first unilateral contract for expressing the behaviors of the first service," among other limitations, as recited in Claim 27.

4. Summary of Patent Application Publication No. 2003/0212540 by Meredith et al. (hereinafter "Meredith II")

Meredith II teaches a method that comprises parsing an expression to obtain syntactical elements that represent a queue, a set of queue delimiters, a query, a sequence delimiter, and other actions. The method translates the expression as a process whose first action is submitting the query as another process to the queue and after which the process continues with other actions. The query includes an organizational scheme formed from a customizable, tag-based language that contains data and describes data.

Applicants are unable to find where Meredith II teaches or suggests the subject matter of the claimed invention. For example, applicants are unable to find the limitation "services for representing resources, each service including a designation primitive, a behavioral primitive that comprises a unilateral contract, and a communication primitive," among other limitations, as recited in Claim 1. Moreover, applicants are unable to find the limitation "a first distributing kernel for designating uniform resource identifiers for a first set of services and distributing messages among the first set of services, each service including a unilateral contract, the unilateral contract expressing behaviors of the service," among other limitations, as recited in

Claim 9. Applicants are also unable to find the limitation "a URI manager for managing names, each name constituting a unique designation of a service at the computer system so that the service can be discovered," among other limitations, as recited in Claim 19. In addition, applicants are unable to find the limitation "assigning a first unique name to a first service upon request, the first service including a first unilateral contract for expressing the behaviors of the first service," among other limitations, as recited in Claim 27.

5. Summary of Patent Application Publication No. 2003/0212672 by Meredith et al. (hereinafter "Meredith III")

Meredith III teaches a method for executing a set of equational laws governing structural equivalents of expressions written in a process-based language. The method parses a first expression. The first expression describes that a query is being executed in parallel with a process. The query has a head, which is empty, and a body, which contains a first name being bound to a second name. The method translates the first expression as structurally equivalent to a second expression. The second expression describes that the query is executed in parallel with the process if the query is in canonical form. Each occurrence of the first name in the process is replaceable with a second name.

Applicants are unable to find where Meredith III teaches or suggests the subject matter of the claimed invention. For example, applicants are unable to find the limitation "services for representing resources, each service including a designation primitive, a behavioral primitive that comprises a unilateral contract, and a communication primitive," among other limitations, as recited in Claim 1. Moreover, applicants are unable to find the limitation "a first distributing kernel for designating uniform resource identifiers for a first set of services and distributing messages among the first set of services, each service including a unilateral contract, the unilateral contract expressing behaviors of the service," among other limitations, as recited in Claim 9. Applicants are also unable to find the limitation "a URI manager for managing names,

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each name constituting a unique designation of a service at the computer system so that the service can be discovered," among other limitations, as recited in Claim 19. In addition, applicants are unable to find the limitation "assigning a first unique name to a first service upon request, the first service including a first unilateral contract for expressing the behaviors of the first service," among other limitations, as recited in Claim 27.

6. Summary of Patent Application Publication No. 2003/0212671 by Meredith et al. (hereinafter "Meredith IV")

Meredith IV teaches a method for executing sets of operational semantics rules governing the meanings of expressions written in a process-based language. The method of Meredith IV includes parsing a first expression. The first expression describes that a process is a choice of two processes. The first process of the two processes expresses that a first query is submitted to a queue, after which the first process continues with a first set of actions. The second process of the two processes expresses that a second query is submitted to the queue, after which the second process continues with a second set of actions. The method further includes reducing the first expression to a second expression. The second expression describes that a third query is submitted to the queue after which the first process runs in parallel with a second process if the first query is in canonical form.

Applicants are unable to find where Meredith IV teaches or suggests the subject matter of the claimed invention. For example, applicants are unable to find the limitation "services for representing resources, each service including a designation primitive, a behavioral primitive that comprises a unilateral contract, and a communication primitive," among other limitations, as recited in Claim 1. Moreover, applicants are unable to find the limitation "a first distributing kernel for designating uniform resource identifiers for a first set of services and distributing messages among the first set of services, each service including a unilateral contract, the unilateral contract expressing behaviors of the service," among other limitations, as recited in

Claim 9. Applicants are also unable to find the limitation "a URI manager for managing names, each name constituting a unique designation of a service at the computer system so that the service can be discovered," among other limitations, as recited in Claim 19. In addition, applicants are unable to find the limitation "assigning a first unique name to a first service upon request, the first service including a first unilateral contract for expressing the behaviors of the first service," among other limitations, as recited in Claim 27.

7. Summary of U.S. Patent No. 6,516,322, Issued to Meredith (Hereinafter "Meredith V")

Meredith V discusses a methodology for encoding mobile process calculi in XML. Mobile process calculi, such as π-calculus, join calculus, blue calculus are often employed in modeling business processes. Meredith V provides for encoding a mobile process algebra in XML by providing a mobile process algebra, reducing the process algebra to in fix notation, transforming the mobile process algebra from in fix notation to prefix notation, and then transforming the prefix notation to a set of tags via structural induction. Annotating tags can then be provided around the basic process algebra constructors. The set of tags represent an XML schema. The XML schema can then be reduced to a programming language.

Applicants are unable to find where Meredith V teaches or suggests the subject matter of the claimed invention. For example, applicants are unable to find the limitation "services for representing resources, each service including a designation primitive, a behavioral primitive that comprises a unilateral contract, and a communication primitive," among other limitations, as recited in Claim 1. Moreover, applicants are unable to find the limitation "a first distributing kernel for designating uniform resource identifiers for a first set of services and distributing messages among the first set of services, each service including a unilateral contract, the unilateral contract expressing behaviors of the service," among other limitations, as recited in Claim 9. Applicants are also unable to find the limitation "a URI manager for managing names, each name constituting a unique designation of a service at the computer system so that the

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service can be discovered," among other limitations, as recited in Claim 19. In addition, applicants are unable to find the limitation "assigning a first unique name to a first service upon request, the first service including a first unilateral contract for expressing the behaviors of the first service," among other limitations, as recited in Claim 27.

8. Summary of U.S. Patent No. 5,452,447, Issued to Nelson et al. (hereinafter "Nelson")

Nelson discusses a method and apparatus for a caching file server system which permits end user client programs on a local node of a distributed computer system to issue requests to read/write data to a remote file and to query/set attributes of the remote file, and to have these requests serviced by the caching file server in a way which minimizes the caching resources used as well as minimizes the related network communications. The caching file server establishes caching file server file programs to interface with the client programs, and sets up a common caching file server cache for the file attributes, which cache is kept current via a communications link to a file program in a file server at the remote node containing the file. The file program automatically updates the common caching file system whenever any attributes are changed. The caching file system also caches the results in order to further minimize network calls and redundant cache usage. In addition, the caching file system coordinates all client program requests for read/write data requests with a virtual memory manager on the local node, servicing all client programs from a single page of program in the virtual memory manager which is coupled to a cache program in the file server of the remote node. The virtual memory manager page-in/page-out operations go directly to the remote file server without caching file server intervention. In this manner, network communications and related processing overhead as well as memory resources may be minimized by use of the virtual memory manager for caching file data and the common caching file system for caching file attributes.

Applicants are unable to find where Nelson teaches or suggests the subject matter of the claimed invention. For example, applicants are unable to find the limitation "services for

representing resources, each service including a designation primitive, a behavioral primitive that comprises a unilateral contract, and a communication primitive," among other limitations, as recited in Claim 1. Moreover, applicants are unable to find the limitation "a first distributing kernel for designating uniform resource identifiers for a first set of services and distributing messages among the first set of services, each service including a unilateral contract, the unilateral contract expressing behaviors of the service," among other limitations, as recited in Claim 9. Applicants are also unable to find the limitation "a URI manager for managing names, each name constituting a unique designation of a service at the computer system so that the service can be discovered," among other limitations, as recited in Claim 19. In addition, applicants are unable to find the limitation "assigning a first unique name to a first service upon request, the first service including a first unilateral contract for expressing the behaviors of the first service," among other limitations, as recited in Claim 27.

9. Summary of U.S. Patent No. 5,566,302, Issued to Khalidi (hereinafter "Khalidi")

Khalidi discusses mechanisms for invocation of objects by client applications and for argument passing between client applications and object implementations, without the client application or the operating system knowing the details of how these mechanisms work. These mechanisms function in a distributed computer environment where client applications may be on one computer node and object implementations on another. The system of Khalidi includes a new type of object, termed "spring object," which includes a method table; a subcontract mechanism; and a data structure which represent the subcontract's local private state. The system of Khalidi is directed to a shared memory subcontract whereby a client and a server can share a memory region for argument and results passing in certain circumstances without the intervention of the kernel and with no restrictions on the type of complexity of the arguments being exchanged.

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Applicants are unable to find where Khalidi teaches or suggests "services for representing resources, each service including a designation primitive, a behavior primitive that comprises a unilateral contract, and a communication primitive," among other limitations, as recited in Claim 1. Khalidi discusses that the subcontract mechanism is the heart of his system, and each subcontract contains a client-side portion and a related server-side portion. See Col. 5, lines 1-5. Unlike the claimed invention, Khalidi does not discuss "a behavior primitive that comprises a unilateral contract" or "a decentralized operating system for orchestrating the services executing on the computer system so as to control and coordinate resources," among other limitations, as recited in Claim 1. Applicants are also unable to find where Khalidi teaches or suggests "a first distributing kernel for designating uniform resource identifiers for a first set of services and distributing messages among the first set of services, each service including a unilateral contract, the unilateral contract expressing behaviors of the service," among other limitations, as recited in Claim 9. Applicants are also unable to find where Khalidi teaches or suggests "a UI manager for managing names, each name constituting a unique designation of a service at the computer system so that the service can be discovered," among other limitations, as recited in Claim 19. Applicants are also unable to find where Khalidi teaches or suggests "assigning a first unique name to a first service upon request, the first service including a first unilateral contract for expressing the behaviors of the first service," among other limitations, as recited in Claim 27.

10. Summary of U.S. Patent No. 5,577,251, Issued to Hamilton et al. (hereinafter "Hamilton I")

Hamilton I describes an object-oriented system for executing applications called by using a plurality of client-side subcontract mechanisms associated with a corresponding plurality of server-side subcontract mechanisms. The system of Hamilton I includes a new type of object, termed "spring object," which includes a method table, a subcontract mechanism and a data structure which represents the subcontract's local private state.

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Applicants are unable to find where Hamilton I teaches or suggests the subject matter of the claimed invention. For example, applicants are unable to find the limitation "services for representing resources, each service including a designation primitive, a behavioral primitive that comprises a unilateral contract, and a communication primitive," among other limitations, as recited in Claim 1. Moreover, applicants are unable to find the limitation "a first distributing kernel for designating uniform resource identifiers for a first set of services and distributing messages among the first set of services, each service including a unilateral contract, the unilateral contract expressing behaviors of the service," among other limitations, as recited in Claim 9. Applicants are also unable to find the limitation "a URI manager for managing names, each name constituting a unique designation of a service at the computer system so that the service can be discovered," among other limitations, as recited in Claim 19. In addition, applicants are unable to find the limitation "assigning a first unique name to a first service upon request, the first service including a first unilateral contract for expressing the behaviors of the first service," among other limitations, as recited in Claim 27.

11. Summary of U.S. Patent No. 5,787,251, Issued to Hamilton et al. (hereinafter "Hamilton II")

Hamilton II is directed to a method and apparatus for implementing subcontracts in distributed processing systems. Each object type in the system of Hamilton II has an associated subcontract. The client-side portion of a subcontract has the ability to generate a new spring object, to delete a spring object, to marshal information about its associated object into a communications buffer, to marshal data in a communication buffer which represents its associated object, to transmit a communications buffer to its associated server-side subcontract, which includes either transmitting an object from one location to another or transmitting a copy of an object from one location to another. The server-side portion of the subcontract mechanism includes the ability to create a spring object, to provide support for processing incoming calls and related communication buffers and to provide support for revoking an object.

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Applicants are unable to find where Hamilton II teaches or suggests the subject matter of the claimed invention. Hamilton II explains that the description of an object and its methods is an interface that is specified in an interface definition language and that the interface is a strongly-typed contract between the implementor (server) and the client of the object. Applicants cannot find where Hamilton II teaches or suggests "services for representing resources, each service including a designation primitive, a behavioral primitive that comprises a unilateral contract, and a communication primitive," among other limitations, as recited in Claim 1. Moreover, applicants are unable to find where Hamilton II teaches or suggests "a first distributing kernel for designating uniform resource identifiers for a first set of services and distributing messages among the first set of services, each service including a unilateral contract, the unilateral contract expressing behaviors of the service," among other limitations, as recited in Claim 9. Applicants are also unable to find where Hamilton II teaches or suggests "a URI manager for managing names, each name constituting a unique designation of a service at the computed system so that the service can be discovered," among other limitations, as recited in Claim 19. Additionally, applicants are unable to find where Hamilton II teaches or suggests "assigning a first unique name to a first service upon request, the first service including a first unilateral contract for expressing the behaviors of the first service," among other limitations, as recited in Claim 27.

12. Summary of U.S. Patent No. 5,428,803, Issued to Chen et al. (hereinafter "Chen")

Chen is directed to a unified parallel processing architecture that connects together in an extendable number of clusters of multiple numbers of processors to create a high performance, parallel processing computer system. Multiple processors are grouped together into four or more physically separable clusters, each cluster having a common cluster shared memory that is symmetrically accessible by all of the processors in that cluster. However, only some of the clusters are adjacently interconnected. Clusters are adjacently interconnected to form a floating

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shared memory if certain memory access conditions relating to relative memory latency and relative data locality can create an effective shared memory parallel programming environment. A shared memory model can be used with programs that can be executed in a cluster shared memory of a single cluster, or in the floating shared memory that is defined across an extended shared memory space comprised of a cluster shared memory of any set of adjacently interconnected clusters. The distributed memory model of Chen can be used with any programs that are to be executed in the cluster shared memory of any non-adjacently interconnected clusters. The adjacent interconnection of multiple clusters of processors create a floating shared memory that effectively combines all three types of memory models, such as pure shared memory, extended shared memory, and distributed shared memory, into a unified parallel processing architecture.

Applicants are unable to find where Chen teaches or suggests the subject matter of the claimed invention. For example, applicants are unable to find the limitation "services for representing resources, each service including a designation primitive, a behavioral primitive that comprises a unilateral contract, and a communication primitive," among other limitations, as recited in Claim 1. Moreover, applicants are unable to find the limitation "a first distributing kernel for designating uniform resource identifiers for a first set of services and distributing messages among the first set of services, each service including a unilateral contract, the unilateral contract expressing behaviors of the service," among other limitations, as recited in Claim 9. Applicants are also unable to find the limitation "a URI manager for managing names, each name constituting a unique designation of a service at the computer system so that the service can be discovered," among other limitations, as recited in Claim 19. In addition, applicants are unable to find the limitation "assigning a first unique name to a first service upon request, the first service including a first unilateral contract for expressing the behaviors of the first service," among other limitations, as recited in Claim 27.

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13. Summary of U.S. Patent No. 5,961,582, Issued to Geines (hereinafter "Geines")

Geines is directed to a distributed and portable execution environment. The system of Geines allows access to resources at a host computer to a remote user without requiring the remote user to have detailed knowledge of the host computer. The system of Geines includes a host virtual operating system, resident on a host computer and having a set of resources, including process control, a file system, inter-process communications, and a set of device interfaces, overlaid on and distinguished from the host computer's actual resources. The virtual host is capable of executing programs in a standardized programming language to provide the ability to run programs that are host-independent. The virtual host is capable of limiting access to the host computer's actual resources. The system also includes a front-end invoked by the remote user. A server program of the host computer receives requests from a client program run by the remote user and provides the virtual host operating system at the host computer. The server program includes an interpreter for the programming language, a process control subsystem, and a virtual file subsystem. The programming language includes a set of primitive commands for invoking the primitive operations of the process control subsystem, including inter-process communication primitive operations, and a set of primitive commands for invoking the primitive operation of the virtual file subsystem.

Applicants are unable to find where Geines teaches or suggests the subject matter of the claimed invention. For example, applicants are unable to find the limitation "services for representing resources, each service including a designation primitive, a behavioral primitive that comprises a unilateral contract, and a communication primitive," among other limitations, as recited in Claim 1. Moreover, applicants are unable to find the limitation "a first distributing kernel for designating uniform resource identifiers for a first set of services and distributing messages among the first set of services, each service including a unilateral contract, the unilateral contract expressing behaviors of the service," among other limitations, as recited in

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Claim 9. Applicants are also unable to find the limitation "a URI manager for managing names, each name constituting a unique designation of a service at the computer system so that the service can be discovered," among other limitations, as recited in Claim 19. In addition, applicants are unable to find the limitation "assigning a first unique name to a first service upon request, the first service including a first unilateral contract for expressing the behaviors of the first service," among other limitations, as recited in Claim 27.

14. Summary of U.S. Patent No. 4,228,496, Issued to Katzman et al. (hereinafter "Katzman")

Katzman is directed to a multiprocessor system in which two or more separate processor modules are interconnected for parallel processing which includes two redundant inter-processor buses dedicated exclusively to inter-processor communication. Any processor module may send information to any other processor module by another bus. The buses are shared and used by the processor modules on a time sharing basis. Use of each bus is controlled by a special bus controller.

Applicants are unable to find where Katzman teaches or suggests the subject matter of the claimed invention. For example, applicants are unable to find the limitation "services for representing resources, each service including a designation primitive, a behavioral primitive that comprises a unilateral contract, and a communication primitive," among other limitations, as recited in Claim 1. Moreover, applicants are unable to find the limitation "a first distributing kernel for designating uniform resource identifiers for a first set of services and distributing messages among the first set of services, each service including a unilateral contract, the unilateral contract expressing behaviors of the service," among other limitations, as recited in Claim 9. Applicants are also unable to find the limitation "a URI manager for managing names, each name constituting a unique designation of a service at the computer system so that the service can be discovered," among other limitations, as recited in Claim 19. In addition, applicants are unable to find the limitation "assigning a first unique name to a first service upon

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request, the first service including a first unilateral contract for expressing the behaviors of the first service," among other limitations, as recited in Claim 27.

15. Summary of U.S. Patent No. 4,769,771, Issued to Lipman et al. (hereinafter "Lipman")

Lipman is directed to a processor system having one or more stations which are interconnected by a general communication network. Each station has one or more processors. Superprocesses which have one or more processes can be executed in the stations. Each superprocess is provided with mail-box space for communication with the environment in which mail-box space the relevant superprocess and other superprocesses can write, but in which only the relevant superprocess itself can read.
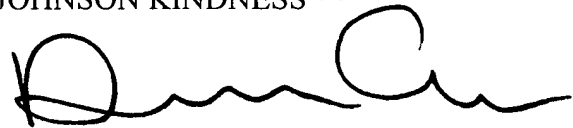
Applicants are unable to find where Lipman teaches or suggests the subject matter of the claimed invention. For example, applicants are unable to find the limitation "services for representing resources, each service including a designation primitive, a behavioral primitive that comprises a unilateral contract, and a communication primitive," among other limitations, as recited in Claim 1. Moreover, applicants are unable to find the limitation "a first distributing kernel for designating uniform resource identifiers for a first set of services and distributing messages among the first set of services, each service including a unilateral contract, the unilateral contract expressing behaviors of the service," among other limitations, as recited in Claim 9. Applicants are also unable to find the limitation "a URI manager for managing names, each name constituting a unique designation of a service at the computer system so that the service can be discovered," among other limitations, as recited in Claim 19. In addition, applicants are unable to find the limitation "assigning a first unique name to a first service upon request, the first service including a first unilateral contract for expressing the behaviors of the first service," among other limitations, as recited in Claim 27.

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CONCLUSION

Independent Claims 1, 9, 19, 27, and 35 are clearly patentably distinguishable over the cited and applied references. Claims 2-8, 10-18, 20-26, 28-34, and 36-40 are allowable because they depend from allowable independent claims and because of the additional limitations added by those claims. Consequently, allowance of Claims 1-40 is respectfully requested. In view of the foregoing remarks, applicants submit that all of the claims in the present application are clearly patentably distinguishable over the teachings of the above-cited references taken alone or in combination. Thus, applicants submit that the application is in condition for allowance.

Respectfully submitted,

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CERTIFICATE OF MAILING

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